

# A short term study of Hungarians learning Finnish vowels

Terhi Peltola<sup>1</sup>, Pertti Palo<sup>2</sup>, Olli Aaltonen<sup>1</sup>

<sup>1</sup> Helsingin yliopisto, <sup>2</sup> Queen Margaret University, Edinburgh

terhi.peltola@helsinki.fi, ppalo@qmu.ac.uk, olli.aaltonen@helsinki.fi

*A group of Hungarian students (n=10) participated in a Finnish phonetics and conversation course during the first 3 months of their language studies. During the course, the students trained in the allophonic variation of Finnish speech sounds, comparing them to Hungarian sounds and participating in group conversation exercises. We call the method used on the course conscious phonetic training of foreign language speech sounds. Additionally, the students participated in one-on-one imitating exercises, which were recorded for the current study. We followed the participants' foreign sounds pronunciation development during the first semester of their studies and compared it to their peers (n=4). The results suggest that participating in the course affected the students' pronunciation skills towards the end of the three-month course, whereas, at the beginning, both of the groups' pronunciation was more similar.*

**Keywords:** foreign language learning, native language interference, conscious phonetic training, acoustic phonetics

## 1. Introduction

Learning foreign sound categories similar to native speech sounds is a difficult task. Perception and production take place without conscious control, and native categories control the learners' perception and production of foreign sounds on a preattentive level (e.g. Peltola et al. 2003). Thus, mastering new foreign sounds is easier than learning foreign sounds similar to native sounds (Flege 1987).

Native sounds' governance of the preattentive perception of foreign sounds can also be considered native language interference on foreign language. However, native language sounds' interference can be interfered, and perhaps even diminished or changed, with phonetic training of foreign languages sounds.

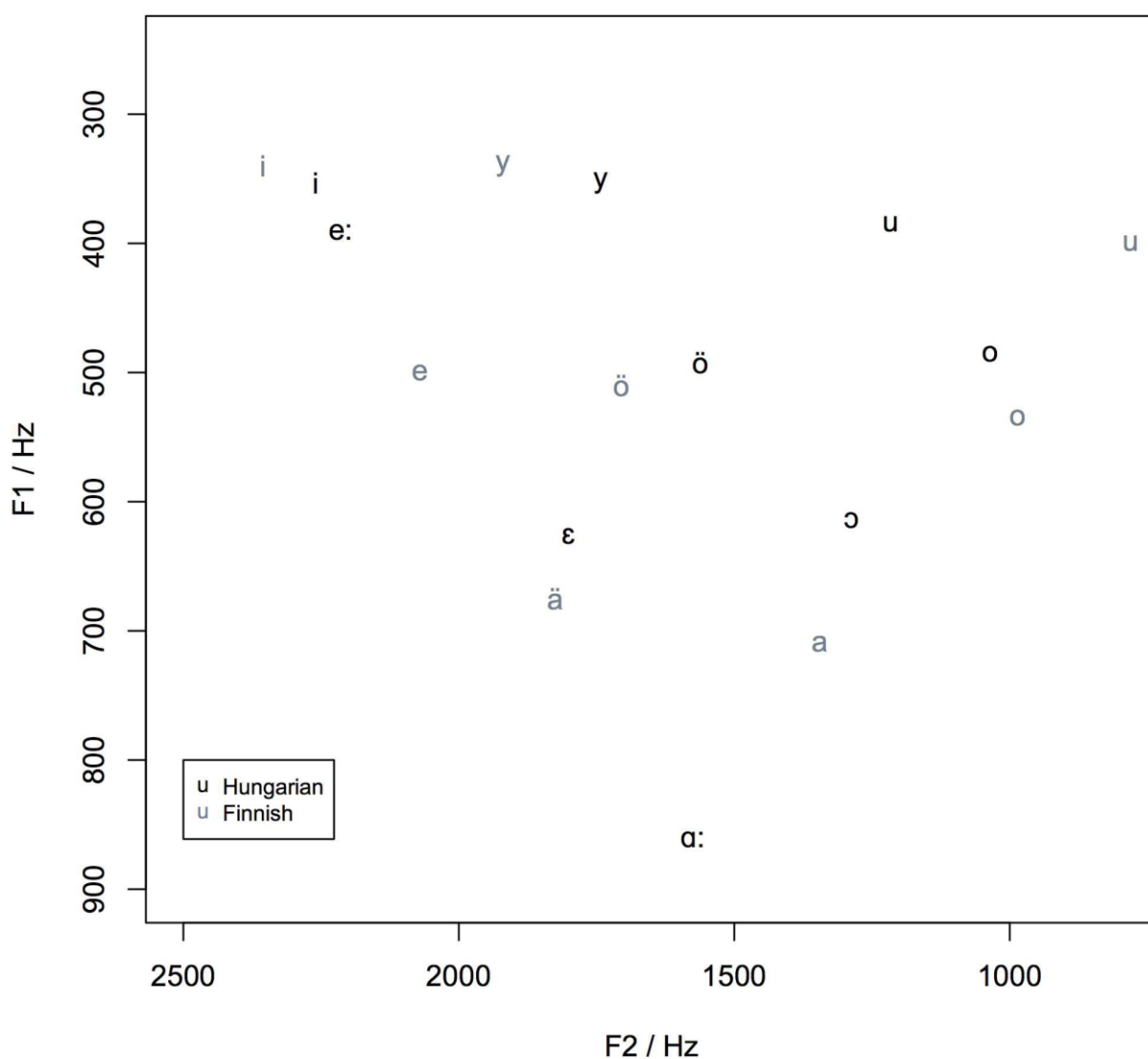
In the current paper, we discuss the possibility of effecting the native sounds' patterns of governance over the similar foreign language sounds by using conscious phonetic training as a classroom teaching method. We also discuss what type of training seems to be effective and how much training is needed, as well as over how long period of time that training needs to take place.

The teaching method used in the current study involves the students in simple pronunciation exercises, which could perhaps be described as drills, as well as longer conversation exercises. We wanted to pursue the issue of whether there is any difference in using passive listen-repeat exercises compared to using exercises that encourage the students to learn by doing in a normal classroom environment. This approach relies on the motor theory of language, according to which speech sounds are encoded in the human memory as a series of the movements they employ (Lieberman & Mattingly 1985). However, the sizes of the participant groups (n=10 and 4) still leave the results rather uncertain.

## **2. Hungarian and Finnish vowels in comparison**

The Finnish phonemic differences causing the most problems (among the vowels) for the Hungarian learners are the ones between the front vowels /i-e-æ/. Comparing the Hungarian /e:-ε/ categories to the Finnish /e-æ/ equivalents reveals that there is a large gap in the Hungarian vowel space, whereas in Finnish, the front vowels are more evenly located over that corner of the vowel space.

There are also some phonetic differences in the back vowels. However, these differences do not cause as significant difficulty to the learner as front vowels, since there are more open back vowels in Hungarian than in Finnish (over differentiating). Sometimes differentiating between the Finnish front /æ/ and back /ɑ/ is also difficult for the Hungarians, because the category boundaries are not on the same area.



**Figure 1.** Finnish and Hungarian vowels in comparison: The average formant values of Hungarian vowels (in black) from the subjects of this study and those of Finnish vowels (in grey, according to Wiik 1965).

### 3. Materials and methods

In this chapter, we describe the data collection methods, classroom teaching, methods of acoustic phonetics used in the study, as well as statistical methods.

#### 3.1. Data collection and processing

Hungarian university students participated in an optional Finnish phonetics and conversation exercise course during the first semester of studying Finnish language and culture. The students trained in correct pronunciation twice per week for 45 minutes in the lessons, which consisted of studying phonetics, conscious phonetic training of Finnish speech sounds and their allophones, and imitation and conversation exercises with native informants – both with the whole group and in smaller groups of three to five students.

In the beginning of the course, half way through, and at the end, the students participated in individual exercises, which were recorded, processed, and analyzed for this study. The exercises consisted of seven blocks of pseudo and real Finnish two-syllable words. The first and the last blocks were read (baselines) and the five in between were imitated by following the native instructor closely.

We followed the development of the students pronunciation during the course. Additionally, we compared the students participating in the phonetics course with the ones who did not. The peer group only took part in the data collection, i.e. reading and imitation exercises, without any phonetic or conversation exercises.

The first and the last (read) blocks of words of the one-on-one exercises were segmented and vowel formants were extracted automatically with a Praat script (Lennes 2003).

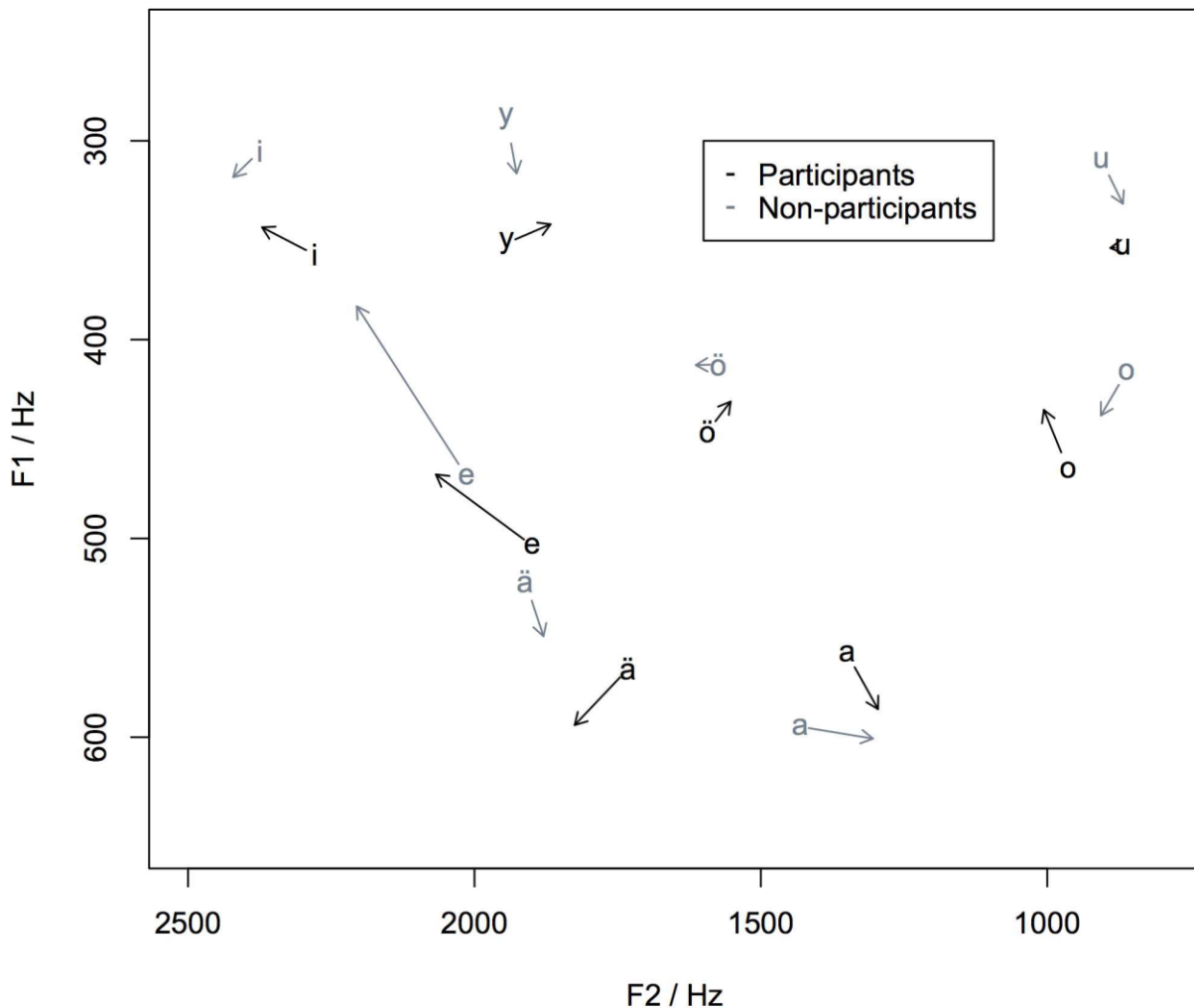
### 3.2. Statistical models

The formant data were analysed with mixed effects models (e.g. Baayen et al. 2008) in R (R Core Team 2012). Four separate models were fitted to the formant data (F1 and F2) of short vowels of the students who participated in the exercises and those who did not. Each combination of formant and group was first fitted with a model with the factors' gender, vowel segment, recording session and first/last (indicating whether the sample was from the first or the last baseline of the session) as fixed effects and the subject as a random effect.

The final models were chosen by first stepping up model complexity (number of parameters) and then stepping down as insignificant effects were identified based on the corresponding t-values. Inclusion/exclusion of independent variables was decided by testing for significance with a likelihood ratio test.

#### 4. Results

All final mixed effect models had the same effects: gender and an interaction of session with the segment and an interaction of the sole random effect – subject – with the segment. The mainly interesting effect of session/vowel interaction is illustrated in Figure 2. The plot was produced by plotting for both groups the interaction effect of session and segment for both analysed formants. The figure shows arrows corresponding to the predicted change in formant values of each vowel from the first recording session to the last.



**Figure 2.** Interaction effects of segment (vowel) and session for both participants and non-participants in F2/F1 space.

#### 4.1. Changes from the beginning to the end of the semester

The imitation exercises did not effect the formant qualities immediately. That is, the baselines from the beginning and the end of a given exercise did not differ statistically. The change was rather gradual and happened during a longer period of time.

Overall, the students who participated on the course have slightly more centralized vowels compared to their peers.

The data seem to indicate that the students who did not participate on the course performed better at the beginning of the course, and rather surprisingly, their /e/ pronunciations drew nearer to the closer Hungarian equivalent towards the end of the first semester language studies.

### 5. Discussion

It seems pronunciation training used in this study has two types of effect on pronunciation. Firstly, the students' pronunciation becomes more *fluent* as some of the vowels' F1 and F2 values are slightly more centralized.

Secondly, pronunciation is more *stable* over a period of time. It appears that all the students were motivated in the beginning of the training, and successfully imitated the model. However, only the ones participating in the pronunciation training course twice per week managed to maintain the differences between the native categories and similar foreign language categories at the end of the course.

Thus, it seems the conscious phonetic training during the first semester of foreign language studies helps the students to create new categories for the foreign vowels /e-æ/ instead of using their own L1 categories over a longer period of time. However, it is impossible to say with these data whether the effect is due to the motivation of the students or conscious phonetic training method and training of the motorics involved in the pronunciation of the given sounds.

### References

Baayen, R.H.; Davidson, D.J.; Bates, D.M (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language* 59: 390–412.

Felge, J. (1987). The production of “new” and “similar” phones in a foreign language: evidence for the effect of equivalence classification. *Journal of Phonetics* 15. Pp. 47-65.

Lennes, M. (2003). The Speech Corpus Toolkit for Praat. <http://www.helsinki.fi/~lennes/praat-scripts/>

Lieberman, A. M., Mattingly, I. G. (1985). The motor theory of speech perception revised. *Cognition* 21 (1): 1-36.

Peltola, M. S., Kuntola, M., Tamminen, H., Hämäläinen, H. & Aaltonen, O. (2005). Early exposure to non-native language alters preattentive vowel perception. *Neuroscience Letters*, 388, 121-125.

R Core Team (2012). R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0.

Wiik, K. (1965). Finnish and English Vowels. A comparison with special reference to the learning problems met by native speakers of Finnish learning English. *Annales Universitatis Turkuensis, Series B*, 94. University of Turku. 94.